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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,602	05/31/2001	Kam Leong	55771 (71699)	8591

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EXAMINER	
AKHAVAN, RAMIN	
ART UNIT	PAPER NUMBER
1636	

DATE MAILED: 01/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Applicant's copy
09871602 12/12/03

Application No.	Applicant(s)	
09/871,602	LEONG ET AL.	
Examiner	**Art Unit**	
Ramin (Ray) Akhavan	1636	

Office Action Summary

-- Th MAILING DATE of this communication appears on th cover sheet with the corr spondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-70* is/are pending in the application.

4a) Of the above claim(s) *37-59 and 61-70* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☒ Claim(s) *60* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *02/07/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I (claims 1-36 and 60) in paper filed 11/3/03 is acknowledged. This application contains claims drawn to an invention nonelected with traverse in Applicant's response to election/restriction filed 11/3/03. Applicant's request for rejoinder is acknowledged. However, the restriction is maintained, as applicant has not provided any argument why the inventions should be rejoined. The claims considered for examination are 1-36 and 60.

Specification

The disclosure is objected to because of the following informalities: There are typographical errors on p. 15, l. 26 and p. 34, l. 14; in the former phosphate is spelled "phophate" and in the latter "be" should be inserted between "can [be] reversibly..." to make the sentence grammatically correct. Appropriate correction is required.

Claim Objections

Claim 60 is objected to because of the following informalities: the claim is dependent on base claims that are nonelected. Therefore claim 60 is withdrawn from consideration. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. **Claims 1-36 and 60 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

The base claims 1 and 17 recite the phrase "polyphosphate having at least one phosphate" indicating that the main chain can have a single phosphate group. It is unclear how the composition can be a polyphosphate and only have as single phosphate group.
In addition the claim is drawn to the composition having at least one hydrophobic moiety. However, it is unclear whether the hydrophobic moiety is in the main chain or is contained in a side chain. The specification only indicates that, "typically ... [the moiety] is pendant from a phosphate group or a charged group that is integral to the main-chain of the polymer."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-15, 17-20, 31, 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Reierson (US 5,846,923)(hereinafter '923).**

The rejected claims are drawn to a biodegradable polyphosphate with at least one phosphate group, one positively charged/chargeable group and hydrophobic moiety.

Furthermore the claims are drawn to the polymer being amphiphilic, having a net positive charge and being biocompatible. In addition the invention is drawn to the hydrophobic moieties being pendant from the main chain and linked to a phosphate group or a charged group that is integral to the main-chain of the polymer. Further, a hydrophilic group can be in the main chain or pendant from the main chain. The invention is further drawn to the polymer having between 5 to 2,000 phosphate groups in the backbone and a molecular weight between 1000 and 1,000,000. The claims are also drawn to the polymer having repeating units of A-B-C-D, where A and C are phosphate groups which can themselves have pendant R groups and where B and D are selected from a specified group. In addition the claims are drawn to the repeating units, where B is a positively charged ammonium group with four different R groups attached or where B and D are positively charged ammonium groups with a total of eight different R groups attached. Additionally, claims add limitations where R groups in the main chain consist of at least a single methylene or an aliphatic chain of methylene groups.

The '923 patent teaches a composition having at least one phosphate group, one chargeable group and one hydrophobic moiety. (e.g. col. 3, ll.40-50). In addition the '923 patent teaches a composition that is amphiphilic, positively charged and biocompatible. (e.g. col. 4, ll. 10-25). The composition in the '923 patent is shown to comprise an R group that can be a saturated or unsaturated aliphatic hydrocarbon (e.g. hydrophobic pentene) pendant from the main chain and linking through a nitrogen atom, which can be positively charged. (Id.). The '923 further teaches that groups being hydrophilic can be in the main chain (e.g. phosphate or ammonium group; Id.). Furthermore the '923 patent teaches that the polyphosphate polymer is made through phosphation reaction which intrinsically indicates that a polymer can be made

comprising any number of phosphates (e.g. 5 to 2000) in the backbone. (e.g. col. 4, ll. 50-65). It would follow then that if a polymer of varying length and pendant R groups is made using the disclosed process, then the composition's molecular weight would be between 1000 to 1,000,000. (e.g. one single pentene is M.W. 104). Furthermore, it would follow that varying length polymers would have a diameter between 50 and 500 nm. Further, the '923 patent teaches that the polymer composition is comprised of repeating units where the main chain comprises ammonium groups that themselves comprise R groups such as methylene. (e.g. Abstract and col.3 ll. 40-50). Therefore the rejected claims are anticipated.

Because the Office does not have the facilities for examining and comparing the applicant's product with the products of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed products and the products of the prior art (e.g. that the products of the prior art do not possess the same material structural and functional characteristics of the claimed product). See in re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

3. **Claims 1-9, 12-15, 17, 20, 27, 29, 31, 33 rejected under 35 U.S.C. 102(b) as being anticipated by Nakaya et al. (Macromolecules, 1989; 22:3180-81)(Nakaya).**

Nakaya teaches a biodegradable compound comprising a polymer – poly (phosphatidylcholine) – formed from monomers comprising an ammonium group linked to a phosphate group with various alkenyl and aliphatic groups in the main chain as well as pendant from the ammonium group. (e.g. p. 3180). Furthermore, the monomer units comprise a tertiary

nitrogen group that would intrinsically become protonated (i.e. positively charged) depending on the pH of the solution in which the polymer is contained. Nakaya does teach that the polymers are hygroscopic and water soluble. (p. 3180, bottom ¶ 2). Moreover, considering the monomers taught are intended to be polymerized, there is no reason to believe that a polymer comprising between 5 and 2000 phosphate groups could not be made, or correlatively that the diameter of the micelle formulated would not be between 50 and 500 nm. Nakaya does teach that estimated molecular weights in the range of 10,000 to 16,000 providing extrinsic evidence that polymers with the repeating . (p. 3180, col. 2, ¶ 3). Moreover, Nakaya teaches that such phospholipid analogues are useful biochemical models of phosphpolipids in biomembranes. (p. 3180, col. 1 ¶ 1). In light of the aforementioned teachings the rejected claims are anticipated.

Because the Office does not have the facilities for examining and comparing the applicant's product with the products of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed products and the products of the prior art (e.g. that the products of the prior art do not possess the same material structural and functional characteristics of the claimed product). See in re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

4. **Claims 1-9, 17-20 rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al. (J. Macro. Sci., Pure and App. Chem., 1995; A32(10):1723-33)(Yamada).**

Yamada teaches monomer units comprising polyphosphate groups that are used in the main chain to form artificial cells. The polymer formed contains repeating units comprising a

biodegradable polymer with at least a single phosphate group, at least a single positively charged group and a single hydrophobic moiety. (e.g. p. 1728, Scheme 1). Furthermore, the polymer is amphiphilic, can contain a net positive charge as it contains tertiary ammonium group. (Id.) Moreover, as there is no limit as to the size of the or variation in length of the polymer taught, intrinsically the polymer of varying length would have between 5 and 2000 phosphate groups in the backbone and correspondingly a diameter between 50 and 500 nm. Yamada expresses that molecular weight average of polymers were 14,700 to 25,600. (e.g. p. 1731). Yamada also teaches that the polymers made share properties with phosphatidylcholines (e.g. p. 1731 bottom ¶), which occur naturally in biomembranes (p. 1723 Introduction). Therefore, absent evidence to the contrary, the polymers disclosed would intrinsically inhere a biocompatible characteristic.

Because the Office does not have the facilities for examining and comparing the applicant's product with the products of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed products and the products of the prior art (e.g. that the products of the prior art do not possess the same material structural and functional characteristics of the claimed product). See in re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

5. Claims 1-2, 4-9, 12-13, 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Korematsu et al. (Pol. Bull. (Berlin) 1997; 38(2):133-40).

Korematsu teaches a biodegradable polyphosphate with at least one phosphate group, one positively charged group and one hydrophobic moiety. (e.g. p. 138, Scheme 1). In addition Korematsu teaches polyphoshpate compositions that comprise repeating units of alternating

phosphate and ammonium groups, where the ammonium groups have pendant alkyl groups attached. (e.g. p. 138, Scheme 1). The polymer disclosed is amphiphilic and contains hydrophobic moieties such as ethylene groups. (e.g. p. 138, Scheme 1; 5a, 6a, 7a). Furthermore, there is no indication that the polymers taught are limited in length, thus absent evidence to the contrary, the polymers can contain between 5 and 2,000 phosphate groups. It would logically follow that such polymers could be of varying molecular weights, e.g. 1000 to 1,000,000 and would have diameters between 50 and 500nm. In addition, Korematsu teaches that intervening R groups in the main chain as between the phosphate and ammonium groups are ethylene. Therefore the rejected claims are anticipated.

Because the Office does not have the facilities for examining and comparing the applicant's product with the products of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed products and the products of the prior art (e.g. that the products of the prior art do not possess the same material structural and functional characteristics of the claimed product). See in re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

6. Claims 1-9, 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. (Macromol. Rapid Comm., 1996; 17:734-44)(Li)

Li teaches an amphipilic phospholipid diol containing hydrophilic phosphatidylcholine analogues in the mains chains and hydrophobic octadecyl, hexadecyl or dodecyl alkyl groups in side chains. (e.g. p. 737, 747 under Results and discussion). Li also teaches that phospholipid polymers show good "biocompatibility and antithrombogenicity characteristics (e.g.

biocompatibility, p. 737, ¶2). Furthermore, there is no indication that the polymers taught are limited in length, thus absent evidence to the contrary, the polymers can contain between 5 and 2,000 phosphate groups. It would logically follow that such polymers could be of varying molecular weights, e.g. 1000 to 1,000,000 and would have diameters between 50 and 500nm. Therefore the rejected claims are anticipated.

Because the Office does not have the facilities for examining and comparing the applicant's product with the products of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed products and the products of the prior art (e.g. that the products of the prior art do not possess the same material structural and functional characteristics of the claimed product). See in re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

Conclusion

No claims are allowed. Claim 60 is objected as being dependent on a rejected claim, but would be allowable if rewritten in independent form incorporating each of the limitations of the claims upon which it is currently depends.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramin (Ray) Akhavan whose telephone number is 703-305-4454. The examiner can normally be reached on 8:00-4:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Remy Yucel, Ph.D. can be reached on 703-305-1998. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0198.

GERRY LEFFERS
PRIMARY EXAMINER

12 Dec 2003